

Amendments to Claims

1. (currently amended) A method of controlling application of a pressurized working gas against one side of a sheet material workpiece to stretch it into conformance with a heated forming surface as a succession of said workpieces are stretched into conformance with said forming surface, said method comprising:

predetermining working gas pressure relationships for stretch forming strain rates over a range of temperatures for said forming of said sheet material workpieces into a desired product shape;

predetermining a forming time-gas pressure application reference schedule at a reference forming temperature for said forming of said product shape; and during the forming of said sheet material workpieces;

continually measuring the temperature at a location selected for controlling the application of gas pressure for forming said sheet material workpieces; and

adjusting the pressure of the working gas applied against said workpiece using a said pre-determined working gas pressure relationship for the measured temperature when said measured temperature differs from said reference forming temperature. ~~continually using said pre-determined pressure relationships to adjust, if necessary, the current application of gas pressure from said pre-determined reference schedule in response to differences between said measured temperature and said reference forming temperature.~~

2. (original) The method as recited in claim 1 in which said sheet material is a metal alloy.

3. (original) The method as recited in claim 1 in which said sheet material is a thermoplastic polymeric material.

4. (original) The method as recited in claim 1 comprising continually measuring the temperature at said heated forming surface for controlling the application of gas pressure for forming said sheet material workpieces.

5. (original) The method as recited in claim 1 in which said pre-determined forming time-pressure application reference schedule comprises increasing said gas forming pressure in step-wise increments with increasing forming time increments from ambient pressure to a final forming pressure.

6. (currently amended) The method as recited in claim 5 comprising adjusting said gas pressure at said forming time increments in response to differences between said measured temperature and said reference forming temperature.

7. (currently amended) The method as recited in claim 1 in which said material is an aluminum sheet metal alloy and said pre-determined stretch forming strain rates are correlated as power law functions of gas forming pressure at said temperatures.

8. (currently amended) A method of controlling the forming of a heated aluminum sheet metal alloy workpiece during application of a pressurized working gas against one side of the heated sheet metal workpiece to stretch it against a heated forming surface as a succession of said workpieces are stretched into conformance with said forming surface, said method comprising:

predetermining working gas pressure relationships for stretch forming strain rates over a range of temperatures for said forming of said sheet metal workpieces into a desired product shape;

predetermining a forming time-gas pressure application reference schedule at a reference forming temperature for said forming of said product shape; and during the forming of said sheet metal workpieces;

continually measuring the temperature at a location selected for controlling the application of gas pressure for forming said sheet metal workpieces; and

adjusting the pressure of the working gas applied against said workpiece using a said pre-determined working gas pressure relationship for the measured temperature when said measured temperature differs from said reference forming temperature. ~~continually using said pre-determined pressure relationships to adjust, if necessary, the current application of gas~~

~~pressure from said pre-determined reference schedule in response to differences between said measured temperature and said reference forming temperature.~~

9. (original) The method as recited in claim 8 comprising continually measuring the temperature at said heated forming surface for controlling the application of gas pressure for forming said sheet metal workpieces.

10. (currently amended) A method of hot blow forming a superplastic aluminum sheet metal alloy workpiece using a pressurized working gas to stretch said workpiece against a forming surface of a heated forming tool into a product shape as a succession of said workpieces are stretched against said forming surface, said method comprising:

pre-heating said workpieces to a temperature in the range of 400°C to about 500°C;
predetermining a forming time-gas pressure application reference schedule at a reference forming temperature of said forming surface in the range of 400°C to about 500°C for said forming of said product shape; and during the forming of said workpieces;

using an electrical control circuit, and electrical resistance heaters in said forming tool, to heat said forming tool to said reference forming temperature;

continually measuring the temperature at said forming surface and comparing the measured temperature with the corresponding reference temperature; and

adjusting the pressure of the working gas applied against said workpiece using a said pre-determined working gas pressure relationship for the measured temperature when said measured temperature differs from said reference forming temperature. ~~continually adjusting, if necessary, the current application of gas pressure to a current workpiece from said pre-determined schedule in response to differences between said measured temperature and said reference forming temperature.~~